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ABSTRACT

The impact of career and technical education (CTE) reforms and comprehensive school reforms in high schools on education outcomes for at-risk youth was examined in a review of research on current reforms. The review identified a series of individual, family and home, school, and community factors that can place students at risk of failing to thrive in school or dropping out. The essential features of the following reform strategies were identified: tech prep; curriculum integration; work-related experience; school-to-work; High Schools That Work; career academies; career magnets; and career pathways. Each strategy's processes and outcomes were identified and evaluated. The following supports were identified: (1) supports for reform (career academies or similar learning structures of small communities focusing on broad career clusters; block scheduling; vertical integration of curriculum from middle school through community college; partnerships with business and postsecondary institutions); (2) supports for

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the capacity for reform (interdisciplinary teacher teams; sustained professional development; work-based learning opportunities); and (3) supports for pedagogical reform (high academic standards and student learning supports to meet standards; authentic assessment; an interdisciplinary curriculum; project-focused learning; technology integrated into classroom learning and used by teachers to monitor student progress). Eight characteristics needed to sustain reform efforts were identified. (Contains 30 references.) (MN)

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Career and Technical Education Reforms and Comprehensive School Reforms in High Schools: Their Impact on Education Outcomes for At-Risk Youth

Highlight Zone: Research @ Work No. 8

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Career and Technical Education Reforms and Comprehensive School Reforms in High Schools: Their Impact on Education Outcomes for At-Risk Youth

by Marisa Castellano, Samuel Stringfield, and James R. Stone III with Morgan V. Lewis

This Highlight Zone is based on a literature review by Marisa Castellano, Samuel Stringfield, and James R. Stone, III, ***Career and Technical Education Reforms in High Schools and Community Colleges: Their Impact on Educational Outcomes for At-Risk Youth***. The complete review is available on the National Centers' website, http://nccte.org/publications/index.asp

Reforms run wide and long in American public education. In the last 15 years, reforms have become more numerous, though not necessarily more effective. Many of these reforms target at-risk students—those in danger of failing and/or dropping out of school. This review examines the research on current reforms in light of a growing number of at-risk students in public high schools, the changing needs of the workplace, and new ideas about preparing students to be productive and successful workers. The larger review on which this paper is based encompasses broad areas of education research: student risk factors; secondary vocational education, now known as career and technical education (CTE); and the interplay of CTE with broader whole-school reforms. The following are some of the key elements and findings in each area.

Student Risk Factors in Education

Studies indicate that many factors, often those beyond a student's control, contribute to failure to thrive in school and to dropping out. Among these are poverty, minority status, family structure, and parents' education. However, there is no one combination that causes school failure or likewise one that ensures success. For decades, students with odds against them have succeeded in high school *and* college.

To understand at-risk students, however, it is necessary to understand the risk factors. These are usually divided among four levels: individual, family or home, school, and community (Dynarski and Gleason, in press). The authors present a clear picture of these risk factors at each level:

Individual. Many circumstances put a student at risk. Among those indicated by studies are limited English proficiency, premature birth, lead poisoning, homelessness, and HIV infection. Another set of risk factors includes high mobility across schools, low self-esteem, high absenteeism in elementary and middle school, and academic difficulty. Being African American or Hispanic also increases an individual student's chance of dropping out, but this variable may operate at one or all of the risk levels.

Family. The circumstances of a student's family can affect the risk of school failure. Surely, poverty is a consistent indicator of this. Mothers' education levels are another predictor of school

failure; parents who were themselves not successful in school may be less able to help their children or advocate for them during high school. Students from single-parent families are also at greater risk of academic failure, as children from such families often score lower on standardized tests and drop out more frequently.

School. Again, poverty is a large risk factor. Schools with large numbers of students from poor families consistently have low graduation rates and achievement scores. School and class sizes also affect success, with large high schools detrimental to student success.

Community. Students in urban schools are at high risk of dropping out because these schools tend to have less-experienced teachers and less funding than suburban schools. Urban schools are also more likely to be populated by students with the risk characteristics described earlier. In fact, graduation rates are low in high schools where many of these factors are concentrated.

Educational Reform in Secondary School, 1985-2001

Vocational education began in the 19th century in the United States. For decades, vocational education prepared generations of students for a needy workplace. But as manufacturing jobs disappeared in the 1970s and 80s, the need for such job-focused preparation declined and enrollments in vocational courses fell off. As American education in general was responding to a series of reports that warned of mediocrity and worse, vocational education was also facing reform. Vocational education was not keeping up with the needs of the workplace. Employers sought workers who were not only skilled but also academically able. Vocational education became career and technical education (CTE) in the 1990s. The focus of career and technical education broadened to include more academics and to prepare students both for the workplace and for college or technical schools. In fact, some educators advocate a combination of CTE and academics for all students.

The Interplay of CTE and Comprehensive School Reform

An extensive review of the literature found no outcome-based studies of high schools involved in both comprehensive and CTE-based school reforms. There were process studies of implementation difficulties when schools tried to implement both a comprehensive design and CTE-based reforms. There were studies of schools where both types of reforms were implemented, but each in different parts of the school, so that the full benefit of both reform efforts was not experienced by anyone. There were no studies of student outcomes in schools that had implemented both types of reforms schoolwide.

The following table presents the essential features of eight reform strategies that have been tested in the last 2 decades. The eight strategies are Tech Prep, curriculum integration, and work-related experience, all encouraged by the 1998 Carl D. Perkins Vocational and Technical Education Act; school-to-work activities based on the School to Work Opportunities Act of 1994; High Schools That Work, a comprehensive school reform design; and career academies, career magnets, and career pathways, which allow for restructuring of groups of students or entire schools into communities based upon broad career themes. Elements of these strategies are presented, along with summaries from the best available evidence on the process and outcomes of implementation.

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Summary of Eight Strategies to Improve Secondary School Performance through a Career Focus

Essential Features	Process Findings	Outcome Findings
Tech Prep		
•An articulation agreement—a formal arrangement aligning curricula—among Tech Prep consortium members, such as school districts and community colleges •Two years of secondary and two years of postsecondary education (or apprenticeship) leading to a degree or certificate •A common core of required proficiency in math, science, and communications •Technical preparation in specified occupational fields •Placement in employment (Boesel and McFarland 1994)	•Parents and students often balk at strictly defined sequences of courses explicitly preparing students for a postsecondary education at a local community college. (Hershey et al. 1998) •Lack of confidence at the community college level that high school courses are equivalent to postsecondary courses. (Urquiola et al. 1997)	In comparison to graduates of the same high schools who did not participate, graduates of "mature" Tech Prep programs are more likely to— •enter two-year postsecondary education, to a slight degree •be employed and among all graduates who are working, to be employed full time •hold more highly skilled and technical jobs •receive larger wage increases (Bragg 2001)
Curriculum Integration		
Teaching communication skills, mathematics, and science in the context of occupations that students are studying in order to increase their relevance and utility	•Teachers typically do not have enough time to work on curriculum integration. (Boesel and McFarland 1994) •Both academic and vocational teachers are resistant to the idea. •High school graduation and college admission requirements often do not recognize or grant credit for integrated courses. (Ramsey et al. 1995) •It is difficult to "scale up" from demonstration to full school adoption. (Levesque et al. 2000)	•There have been few studies that assess the effectiveness of integration. (Stasz et al. 1998) •Anecdotal evidence suggests increased student engagement and achievement. (Lynn and Wills 1994)
Work-Related Experience		
Participation in workplace learning opportunities that are coordinated and sequenced with learning at school, e.g., youth apprenticeships, cooperative education	Firms with limited contact with schools often have negative attitudes toward youth. (Zemsky 1994)	•Programs that began before grade 11 were more likely to succeed in keeping young people engaged in high school. (Pauly et al. 1994) •Firms that provide structured work-based learning opportunities are pleased with the quality of the work done by young people. (Steinberg 1998)
School-to-Work (STW)		
Use of school-based learning, work-based learning, and connecting activities to achieve systemic change that provides students with the knowledge and skills needed for success following high school in postsecondary education and employment.	•Limited number of workplaces willing and able to work with schools to provide slots for students •Limited application or exploration of school-based knowledge such as reading, writing, or mathematics on the job •Student experiences at their work sites rarely used as the basis for structured academic activities or assignments at school (Hughes et al. 1999)	•Some evaluations found slightly negative outcomes (decline in grades and attendance) for STW students versus a comparable control group; others found slightly positive effects including lower school absence rates, higher college attendance rates, and longer and higher-paying employment. (Urquiola et al. 1997) •Students felt that involvement in STW activities helped them clarify career goals and broadened options. (Hershey et al. 1998)

Essential Features	Process Findings	Outcome Findings
High Schools That Work		
•Rigorous vocational courses along with more required academic coursework •Common planning time for teachers to collaborate on curriculum integration •Higher standards and expecta tions for all students •Extra help for students •Individualized advising system •Use of assessment information to improve student learning (Bottoms and Presson 2000)	About half of vocational teachers report they need professional development in integrating academic and occupational content. (Bottoms and Presson 2000)	•Schools that implement the model faithfully usually see improved student achievement, and higher rates of attendance, graduation, retention, and postsecondary enrollment (NWREL 1999). •Improvement on HSTW assessment, based on the National Assessment of Educational Progress (NAEP) tests occurs. (Kaufman et al. 2000)
Career Academies		
•School within a school, where students stay with a group of teachers over 3 or 4 years •Both academic and vocational curriculum, usually integrated around a career theme •Established partnerships with businesses in order to build connections between school and work (Kemple and Snipes 2000)	•Teachers and administrators at both secondary and postsecondary levels often question the rigor of an integrated curriculum. •Many teachers need training and practice to develop such curricula. •Teachers need to spend time in workplaces to understand how their subjects are used, which requires administrative support for release time and common planning periods. (Kemple and Snipes 2000)	•Among students at risk of dropping out, career academies significantly reduced dropout rates and increased attendance and credits earned. •Among students at low risk of dropping out, career academies increased their likelihood of graduating on schedule and increased their vocational course taking without reducing academic core curriculum. •Academies that provided strong interpersonal supports to students in the early years of high school appeared to be most successful in achieving positive outcomes. (Kemple and Snipes 2000) •In one inner-city district, academy students were more successful than their nonacademy counterparts at a local 4-year university. (Maxwell 1999)
Career Magnets		
•Career magnet schools include college preparation and are designed to attract students from across a district because of their career focus. •Some magnets are schools within schools whereas others are freestanding.	Career magnet schools in one city studied were required to serve certain percentages of weaker students without additional resources, and some teachers felt that this diverted resources from the career focus. (Crain et al. 1999)	•Students of average reading ability who attended freestanding magnets earned more course credits and increased their reading skills. •Low-scoring readers at freestanding career magnets were more likely to attend high school and more likely to pass the state Regents math test. •Magnets that provided students with a greater career focus were most effective with poor readers. (Crain et al. 1999) •Later analyses found little difference between students from magnet schools and those from comprehensive high schools. (Urquiola et al. 1997)

Essential Features	Process Findings	Outcome Findings
Career Pathways		
•A means of reorganizing the high school, career pathways replace the traditional college preparatory, vocational, and general tracks. •Students are organized along clusters of occupations with similar interests and strengths, such as allied health. Specific jobs have varying training and education requirements.	No process studies to date	•No large-scale, random assignment outcome studies to date •At one high school with a large limited English speaking population, the rate of public college attendance in the second and third years of implementation increased by 39%. •At the same high school, enrollment in advanced placement courses increased. In the case of AP Calculus, enrollment increased 87%. (Robinson 1999)

Note: The studies cited in the table are from Castellano, Stringfield, and Stone (2001). A review by Hughes, Bailey, and Mechur (2001) covers some of this same literature as well as many other studies.

Conclusions

The reform elements present in the strategies discussed have been examined from perspectives that include researchers, school reformers, and policy advocates (American Youth Policy Forum 2000; Andrew et al. 1997; Coalition of Essential Schools 1998; Legters 1999; Lynch 2000; National Association of Secondary School Principals 1996). A consensus has emerged around those reform components that result in increased student involvement in learning. The evidence that such involvement leads to improved academic performance—as usually measured—is more limited but in some cases positive. Castellano, Stringfield, and Stone (2001) group these components into those that support structure, capacity, and pedagogy of reforms:

Supports for Structural Reforms	Supports for the Capacity for Reform	Supports for Pedagogical Reform
• Career academies or similar learning structures of small communities that focus on broad career clusters • Block scheduling or other alternative schedules for longer learning times • Vertical integration of curriculum spanning middle schools, high schools, and community colleges • Partnerships with business and post-secondary institutions • Career exploration beginning in the middle school	• Interdisciplinary teacher teams with common planning time provided • Sustained professional development • Work-based learning opportunities for job shadowing to more intensive forms	• High academic standards and student learning supports to meet the standards • Authentic assessment • Interdisciplinary curriculum that integrates rigorous academics and real-world applications, often with a career focus • Project-based learning • Technology integrated into classroom learning and used by teachers to monitor student progress

Clearly, vocational instructors alone, or even working with their academic colleagues, cannot accomplish implementation of all these supports. There must be a total school commitment that is reflected in a planned approach that has been crafted and endorsed by all involved. Datnow and Stringfield (2000) have described eight characteristics that are necessary for reform efforts to be sustained:

1. A finite set of widely shared goals should be established.

2. Goals must be tied to a long-term, whole-team focus on key measures of school improvement.

3. Districts must develop a coordinated and broad-based plan for disseminating information about reform options, prior to the school- or district-level commitment to reform.

4. School must engage in a thoughtful, critical process of inquiry about what needs to change and why.

5. Reform designs (and reform designers) must do the following:
   a. view local context and the diversity of language, race, class, and gender of those involved as strengths to build on;
   b. see teachers as assets and collaborators, not simply implementers of reform;
   c. address technical, normative, and political dimensions of change;
   d. affect the whole school, not just a safe "pocket" of people who are particularly eager to change; and
   e. include equity as an explicit goal of reform.

6. The district, school, and any external partners must provide multidimensional, ongoing support and leadership for the reform.

7. Policy systems need to be aligned in order to support the reform effort.

8. Successful implementation requires sensitivity and adaptability (without academic compromise) on the part of all key players. States, districts, and design teams must be willing to change along with the schools and teachers. Such active, shared growth is at the heart of both coconstruction and high reliability.

All of these strategies and characteristics are complex and take time to achieve, but if there is broad support, a limited set of goals, and carefully constructed strategies, schools can change and expand the opportunities open to their students. The reforms described here can herald the beginning of a new vocational education, one linked to comprehensive school reform. This is an approach, buoyed by millions of federal dollars for schools, that requires reflection on the whole school and proposes changes in climate, structure, curriculum, administration, and professional development. One of the keys of comprehensive reform is relevance, which helps keep students in school and interested. Focusing on career opportunities or special interests is one way to make education relevant. Thus, it seems that the combination of career and technical education with rigorous academics for all students is a reform model worth considering. Together, these efforts can address the need that all students have for a solid academic education, as well as for preparation for adult life, including work.

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The Highlight Zone: Research @ Work is designed to highlight research findings and provide a synthesis of other information sources. The intention is to help practitioners apply and adapt research results for local use.

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